

inhalation therapy

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December 1960

Volume 5 Number 6

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The Problem of Combating
Bacteria

The Announcement on
Registry

The Complete Story of the
Minneapolis Meeting

Some Reasons for Developing an
I. T. Department

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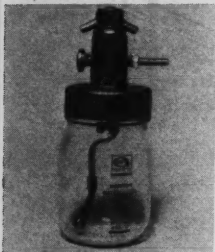


JOURNAL OF THE AMERICAN ASSOCIATION OF INHALATION THERAPISTS



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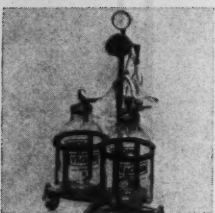
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inhalation therapy

DECEMBER 1960

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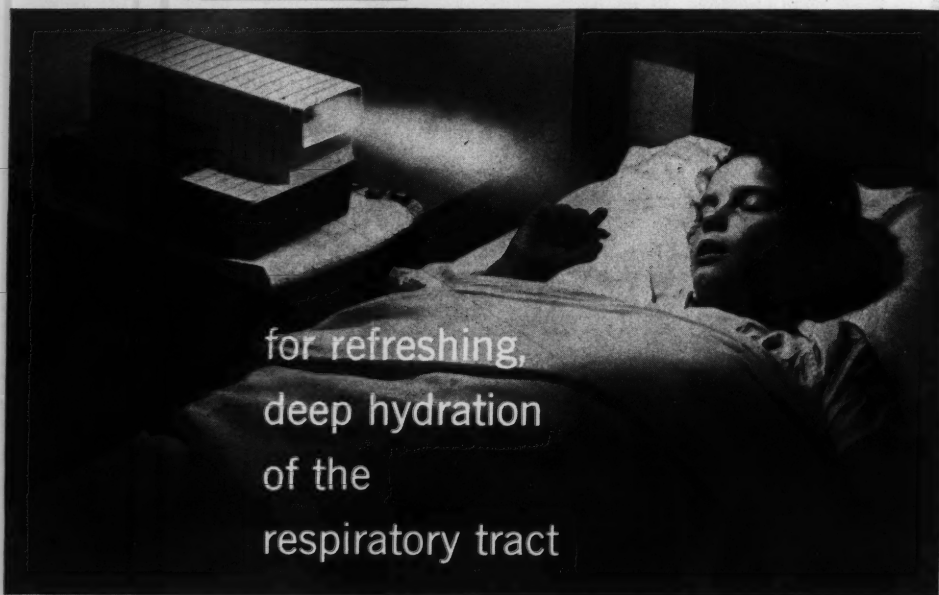
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1. Smessaert, Andre; Collins, V. J., and Krocum, V. D.: *New York J. Med.* 55:587, June 1, 1955.

2. Bonval, A. L.: *Geriatrics* 14:621, Oct., 1959.

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Editorial

"Staph" Precautions Must Be Respected!

HOSPITALS are now well aware of the existence of the problem of infections arising within the institution. Although a great deal of magazine space has been devoted to staphylococcal infection in the hospital, the fact remains that there are other equally dangerous but less well-publicized infections which are also in the hospital, and whose cause is the same. *The real cause of these infections is the failure to take precaution to prevent the transmission of bacteria from people who have them to people who do not.*

The meaning of rigorous hospital sanitation discipline is only beginning to penetrate into the minds of our physicians, nurses and hospital administrators. Survey after survey demonstrates areas which could easily become the focus of a hospital infection, and each one serves to remind us that we have not yet done all we should have to eliminate the hospital as a source of infection by staphylococcus and other bacteria which are equally lethal.

The main sources of infection are people. It would be most effective if people could be controlled absolutely, but this approach would not be practical. It is quite practical, however, to oblige everyone who comes into a hospital to report if he suffers from an infection such as a boil or a sore throat. It is impossible to refuse persons suffering from infections admission to the hospital just because they have an infection. This is the purpose of the hospital, to treat people and their ailments. But it is true that under certain conditions boils and carbuncles may become highly infectious, and staphylococci may spread rapidly throughout the hospital if they are not checked. *If we are to prevent spread, we must maintain absolute isolation for such patients, and enforce upon all personnel who deal with them a very stringent form of discipline in isolation techniques.*

But even with the best of precautions, there is bound to be a transfer of organisms from one part of a hospital to another via the various routes which have been identified so well in the many scientific reports and medical articles.

Undisciplined personnel working in the hospital are undoubtedly a prime cause of transmission of infection. Carelessness in such matters as scrubbing before an operation, changing of gowns after coming out of an infected patient's room, tracking bacteria back and forth through the general hospital corridors to the sensitive areas such

as the nursery, the operating room and the maternity service must be forbidden. *But even if discipline is well enforced, it is of little moment if the environment is not kept completely clean at all times. For the environment acquires infection from those who have it, and transmits it to those who do not have it.*

Electric beds and other equipment, such as oxygen tents, which depend upon electricity, should be constructed in such a way that the motor is sealed off so that no damage can come to it through cleaning and disinfecting procedures. Otherwise, special measures for cleaning will have to be taken by the maintenance department.

There are still some hospitals who claim ultraviolet light is the answer in the operating room, in the nursery and elsewhere. Ultraviolet has not been proven scientifically to have effect upon bacteria except under controlled conditions. Hospitals which are so clean as to maintain good sanitation in addition to the ultraviolet light probably were free from infection to start with. It may be that one of ultraviolet light's contributions is the creation of a psychological consciousness that sanitation is important; otherwise, I have seen no reason to recommend it.

One manufacturer has now produced a spray containing a metallic compound. Unscrupulous salesmen, though not the company itself, are claiming that by merely spraying this compound in the operating room or in the room of an infectious patient, bacteria will be killed. These compounds have no depth of penetrability into soil, especially dried soil. Although it might be possible to disinfect the surface, the underlying soil still contains the infectious agents. Such compounds are only useful against a certain type of soil where the relative humidity would be very high and permit the aerosols to be used with the maximum effectiveness.

Germicidal aerosols are by no means new. The great Lord Lister himself used a carbolic spray in his operating room against air-borne contaminants. Sodium hypochlorite mist was also used in hospitals in Europe, and various chemicals have been suggested from time to time, including iodine vapor. All have been discarded as unsatisfactory.

Triethylene glycol was vaporized in operating rooms without much success, but is being marketed successfully as the answer to our sanitation problems.

There is a long painstaking job ahead of us. Procedures must be worked out for cleaning of every single piece of equipment which is used in the hospital. Better ways must be found to make the air safe from infection, and better ways must be found to prevent the infection from saturating the hospital. Better sanitation discipline must be secured among the hospital personnel.

C. U. Letourneau, M.D.
Editorial Director
Hospital Management Magazine

AMERICAN ASSOCIATION OF INHALATION THERAPISTS

THE AMERICAN ASSOCIATION OF INHALATION THERAPISTS is an organization of therapy technicians working: In hospitals, for firms providing emergency therapy service, and for municipal organizations. The Association is sponsored jointly by the American College of Chest Physicians and the American Society of Anesthesiologists. Three doctors from each group comprise the joint Board of Advisors to the AAIT, which has nearly 1,000 members in the United States, Canada, and several countries abroad.



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Why Should We Worry About Bacteria?

by Daniel J. Moos, M.D., F.A.C.S.*

The problem of combatting hospital infections concerns not only doctors and nurses, but everybody who works in the hospital. Sometimes we get impatient with precaution procedures, or with sterilizing routines, because we cannot *see* the micro-organisms we're doing battle with. In an effort to help understand the reasons behind these procedures, we present here a few basic facts about these tiny creatures and the infections they cause.

We are surrounded by a host of organisms that we can't see; nevertheless, they play important roles in our lives. Broadly, they are divided into three groups: (1) bacteria, (2) molds and fungi, and (3) viruses. Space does not permit going into the latter two groups; we will concentrate here on bacteria.

The bacterium is an uncomplicated form of plant life—a single cell of average size about 0.8 micron, but sometimes as large as 2 or 3 microns (a micron is a unit of measure approximately equivalent to 1/25,000th of an inch). Some bacteria need oxygen to live; these are called *aerobic*. Others cannot live in its presence; they are known as *anaerobic*. There are

those which "fix" nitrogen in the soil (combine atmospheric N_2 with soil chemicals). Some of the other soil bacteria which carry on useful processes there—for example, the organisms of gas gangrene and tetanus—can cause serious illness if they gain access to the body.

Bacteria are classified according to their morphology (form), as *coccus*, *bacillus* or *spirochete*. The word *coccus* (plural, *cocci*) simply means spherical: when you look at them under the microscope they appear round. The *bacilli* (plural of *bacillus*) appear rod-shaped; the *spirochetes*, spiral-shaped. These are very broad classifications, and under each division there are a great many subclassifications, each having certain characteristic size, shape and growth patterns and responses that the trained bacteriologist is able to recognize. Thus, there are *diplococci*—cocci which are always found growing in twos; *staphylococci*—so-called because they occur in bunches like grapes; and *streptococci*—named from their tendency to hang together in chains of 10 to 30.

Some of these organisms cause diseases; others don't. Some are actually necessary for life itself. A normal growth of bacteria in the intestinal tract, for example, is essential for proper digestion and assimila-

*Chairman of Committee on Infections, Dept. of Surgery, Northwestern Hospital, Minneapolis, Minnesota.

tion of our food. We hear of staphylococcal enteritis occurring in surgical patients under certain circumstances. Ordinarily those particular staphylococci do not cause any trouble at all, and they are there in the intestinal tract all the time, aiding in the digestion of food and the decomposition of organic matter into chemical components simple enough for absorption into the body. But the presence of many different organisms exerts a mutual inhibition of excessive growth of any one of them.

When an antibiotic is given, however, not all the bacteria are equally affected. Thus, some die out and leave the remaining strains free to multiply in an unchecked and overwhelming fashion that makes the host person sick.

Before the use of antibiotics, staphylococci were not considered a serious problem. The problem of sepsis (infection) in the pre-World War II days was largely with streptococci, which caused virulent infections that spread rapidly. They never localized into abscesses, and were very difficult to treat. On the other hand, while it was known that staphylococci were dangerous and could kill people, it was felt from the treatment point of view that they were less virulent, because they were the common cause of boils or other abscesses which would

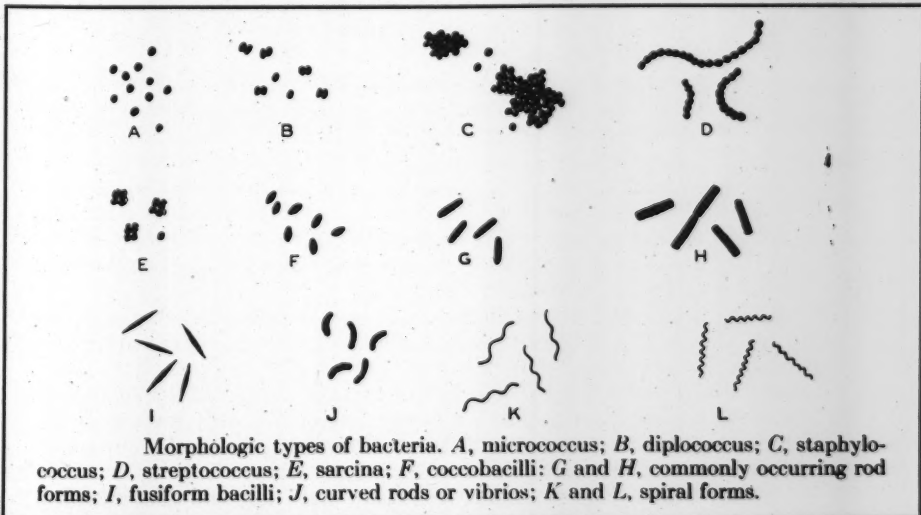
localize and could be opened and drained by a surgeon. But with the increasing degree of resistance the staphylococci are developing to many of our antibiotics, this situation has reversed itself, and they now present one of our major infection hazards.

Whether infection occurs or not depends upon three factors: (1) the virulence of the organism, (2) resistance of the host, and (3) dose of the organism. One could introduce a weak strain of staphylococci into a wound and cause no trouble at all. Every surgical wound that's made gets some staphylococci in it, because they are everywhere. Fortunately, most of them are not very virulent.

Many people have built up resistance to infections. We've all survived our childhood, living through periods of infections — some slight, some severe — and from these we have developed a certain degree of immunity to many things. Hence, if organisms get into an open wound, even though they may be fairly potent ones, we may not develop an infection if the body's resistance to the particular invading organism is high: we simply kill them off, and no infection results.

Similarly, the *number* of bacteria entering has a bearing on the onset of an infection. Even persons with moderate

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From Jordan & Burrows' **TEXTBOOK OF BACTERIOLOGY**, 14th edition, courtesy of W. B. Saunders Publishing Company, Philadelphia

ANNOUNCEMENT

AMERICAN REGISTRY OF INHALATION THERAPISTS

Incorporated November 7, 1960, as a Not-for-Profit Corporation
in the State of Illinois

SPONSORS

American Association of Inhalation Therapists
American College of Chest Physicians
American Society of Anesthesiologists

PURPOSE

The objects and purposes of the Registry are:

- (1) To advance the art and science of medicine by promotion of the understanding and utilization of inhalation therapy in the prevention and treatment of human ailments.
- (2) To assist in developing and maintaining educational and ethical standards in inhalation therapy for the public good, for the advancements of medical care, and for the professional guidance of registrants of the Registry.
- (3) To establish standards by which the competency of inhalation therapists to administer inhalation therapy under the prescription, direction and supervision of licensed physicians may be determined.
- (4) To prepare, conduct, and control investigations and examinations to test the qualifications of voluntary candidates for certification.
- (5) To grant and issue certificates to qualified inhalation therapists, and to maintain a registry and make available a list of such registrants.
- (6) To do and perform any and all things necessary or desirable to accomplish the foregoing specified Registration purposes.

REGISTRATION

Section 1. Qualifications required for Registration.

- (a) Applicants for registration as inhalation therapists shall:
 - (1) be over 21 years of age;
 - (2) be of good moral character; and
 - (3) have a high school education or its equivalent, as shown by such documentary evidence as the Board of Trustees shall deem acceptable.
- (b) Applicants shall be members in good standing of the American Association of Inhalation Therapists, provided that said Association's participation in the business of this Corporation has not been terminated pursuant to the provisions of Article III, Section 4 of these By-Laws at the time of filing of the application for registration.
- (c) All applicants shall be graduates of a school of inhalation therapy complying with the criteria and standards established by the American Medical Association; provided that, until such standards have been established and there are a sufficient number of accredited schools to meet the demand for trained graduates, compliance with any one of the following shall be deemed to suffice in lieu of the aforesaid requirement that applicant be a graduate of an accredited school:
 - (1) Three years experience in inhalation therapy and under medical supervision at the time of filing of the application for registration.

- (2) A graduate of a school of inhalation therapy acceptable to the Registry.
- (d) All applicants shall have had at least one year of experience as an inhalation therapist, in addition to training, under the direct supervision of a licensed physician.
- (e) All applicants must pass a written and oral examination under the supervision of the Board of Trustees.

The Board of Trustees may adopt other Rules and Regulations from time to time defining more specifically the foregoing qualifications.

Section 2. Application and Examination for Registration. Applicants for registration shall furnish the Board of Trustees with a completed application for registration in the form approved by the Board of Trustees containing complete information evidencing applicant's compliance with the aforesaid requirements for certification by the Registry. In support of such application, applicant shall furnish such documentary evidence and references as may be required by the Board of Trustees. Applications shall be filed with the Executive Director of the Corporation together with a fee in such amount as is fixed from time to time by the Board of Trustees.

Examinations shall be conducted at such times and places as the Board of Trustees shall determine. Such examinations shall be conducted under rules established therefor by the Board of Trustees, and under their supervision and control.

MEDICAL SUPERVISION is defined as supervision, control, and responsibility for the technical quality of inhalation therapy by a physician or committee of physicians qualified in inhalation therapy.

FEES

Registration \$25.00

Yearly Re-registration \$2.00

Repeat Examination \$10.00

EXAMINATIONS

Written: February, 1961. Time and Places to be determined.

Oral: During Tri-State Hospital Assembly between April 30 and May 6, 1961, Chicago, Illinois
During the Annual Meeting, American Association of Inhalation Therapists, November 5, 1961 to November 9, 1961, Buffalo, New York.

APPLICATIONS

Mail request for Application Blank by January 15, 1961, to Registrar:

Sister M. Yvonne
St. Francis Hospital
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Minneapolis AAIT meeting makes major news again

Registry born; Recognition awards; Canadians given Affiliate status

Joseph J. Klocek is new President;
Paul Noble Price Chairman of Board

by James F. Whitacre

UNQUESTIONABLY the most significant event of the AAIT's Sixth Annual meeting held November 14-18, 1960 at the Pick-Nicollet Hotel in Minneapolis, Minnesota, was the official formation of the American Registry of Inhalation Therapists. Full particulars regarding the Registry and pre-requisites for examination are in a separate story starting on page 14.

For the first time in its history, the AAIT presented awards to five persons for distinguished service to the field. These were Sr. M. Rudolph, St. John's Hospital, Springfield, Illinois; Sr. M. Borromeo, St. Francis Hospital, Keokuk, Iowa; Dr. Edwin Emma, Booth Memorial Hospital, Flushing, New York; Dr. Arthur H. Bulbulian, Mayo Clinic, Rochester, Minnesota; and Dr. Alvan L. Barach, Columbia-Presbyterian Hospital, New York.

Since Canadian physicians have been reticent to assume sponsorship of an American organization, the Canadian AAIT members have formed the Canadian Association of Inhalation Therapists, which is now affiliated with the AAIT and will be represented on the AAIT Board of Directors. The CAIT has no membership categories for industrial or service members, however; so the present Canadian industrial and service members of the AAIT are retaining their AAIT membership, and will have liaison with the CAIT. The founding Board of Directors for the CAIT are: Chairman, James Sharkey of Queen Mary Veterans' Hospital; Secretary, Jack Sangster of Montreal General Hospital; Robert K. Merry of

Royal Victoria Hospital; and Louis Hébert of St. Justine's Hospital—all of Montreal.

National Officers elected at the annual business meeting November 17 were: President, Joseph J. Klocek, R.N., Columbia-Presbyterian Hospital, New York; First Vice President, Leah Tharaldson, C.R.-N.A., Northwestern Hospital, Minneapolis; Second Vice President, Bernard Kew, St. Alexis Hospital, Cleveland; Secretary-Treasurer, Agnes Forrest, Chicago. Paul Noble Price of Methodist Hospital, Indianapolis, was named Chairman of the Board, and the four new Board members elected (term to expire in 1963) were: Walter D. Palmer, Children's Hospital, Philadelphia; Walter L. Jones, U.C.L.A. Medical Center, Los Angeles; Jerome Heydenberk, Bronson Methodist Hospital, Kalamazoo; and Vivian Curtis, R.N., St. Anthony's Hospital, Denver.

Continuing Board members are as follows: Term expiring in 1961—Sr. M. Arnoldine, St. Joseph's Hospital, Fort Wayne, Indiana; Larry E. Ross, Baptist Hospital, Nashville, Tennessee; Joseph J. Klocek, R.N.; Don E. Gilbert, University Medical Center, Ann Arbor, Michigan. Term expiring in 1962—Paul Noble Price; Sr. M. Blanche, Good Samaritan Hospital, Zanesville, Ohio; James E. Peo, R.N., Delaware Hospital, Wilmington, Delaware; Mrs. Grace Farley, R.N., Baylor University Medical Center, Dallas; Jack Sangster.

The Eastern Kansas-Western Missouri chapter received its charter at the meeting. Its president is Carl Ritchie, Menorah Medical Center, Kansas City, Mo. This brings the chapter total to 18, and there

are several others in formation at present.

There were 363 attending the convention, with representation from Canada and 28 states. Twenty-five exhibitors displayed the latest in equipment in their booths, which were manned by skilled technical personnel to answer the flood of questions about the practical application of the devices.

Vincent J. Collins, M.D., Assoc. Prof. Anesthesiology, New York University Postgraduate School of Medicine, New York, speaking on "Inhalation Therapy—Its Past and Future," traced the development of inhalation therapy as a para-medical specialty, and inspired the group to build on these sturdy foundations an ever-better professional service.

One afternoon was devoted to the third annual Roundtable session, with discussion tables on Registry, Humidity, Public Relations with Nursing Teams, Intensive Care Units, IPPB Problems, and other topics.

"Oxygen—P.R.N." was the title of a talk given by Edwin R. Levine, M.D., Director, Department of Inhalation Therapy, Edgewater Hospital, Chicago. P.R.N. orders necessitate that *somebody* has to decide when the patient needs oxygen, since the doctor who wrote the order will not usually be there, Dr. Levine said. In discussing what basis this decision should rest on, he remarked that "It is absolutely criminal to wait until cyanosis is manifest," because by this time there may be some

irreversible changes. Also, in the *anemic* patient, cyanosis may never appear at all. One of the earliest and most reliable signs of the need for oxygen is an increased pulse rate, and he feels we should pay more attention to this easily obtainable information in arriving at our decisions. He also advanced the ideas of exercising with oxygen as a means of regaining muscular strength without overtaxing respiratory and circulatory systems, and the use of oxygen to help the patient practice breathing slowly and deeply instead of rapidly.

In his talk on "Types of Hypoxia, and Effects of Oxygen Administered by Various Methods," Dr. H. Frederic Helmholtz, Jr., of the Mayo Clinic, Rochester, Minnesota, traced the development of the earth and its atmosphere, emphasizing the late appearance of oxygen on the scene. He then developed the cellular metabolic processes possible without oxygen and those requiring it, describing in some detail the enzyme systems and how they do not work with too much or too little oxygen. The oxygen supply needs to be at an adequate pressure, and all hypoxia reduces to insufficient pressure of oxygen at the cellular level, he said.

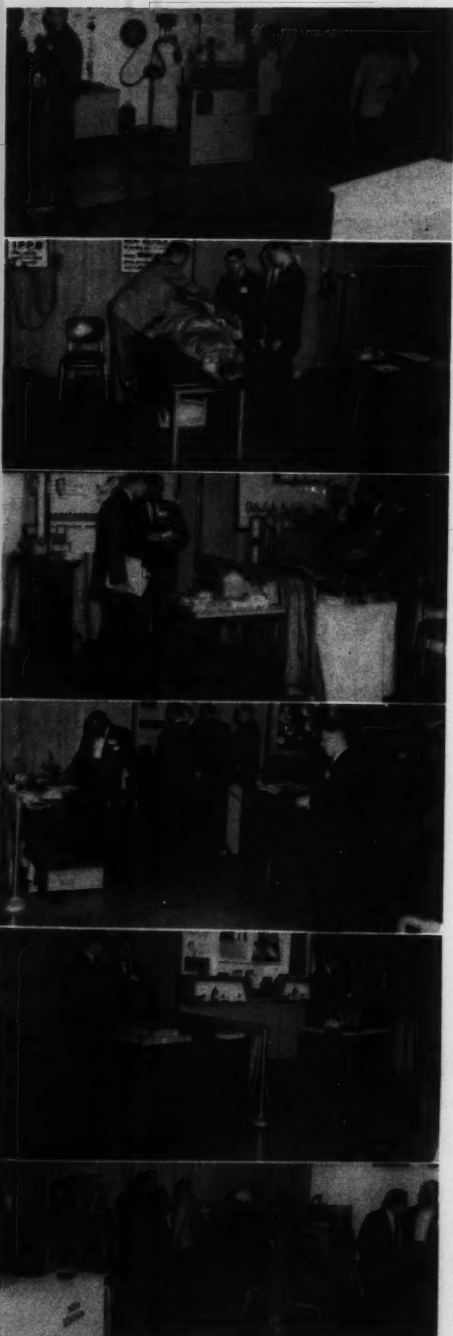
"Real and Fancied Dangers in Oxygen Administration" were discussed by Dr. Allan Hurst, Director of Inhalation Therapy at General Rose and St. Anthony Hospitals, Denver. He referred to the classic

continued on page 18



Mr. Joseph Kloczek, R.N. (center), new president of the A.A.I.T. flanked (from left to right) by new Board of

Director members Mrs. Vivian Curtis, Mr. Walter Palmer, Mr. Jerry Heydenberk and Mr. Walter Jones



The latest in equipment was displayed and demonstrated to A.A.I.T. members at an all time high of 28 booths

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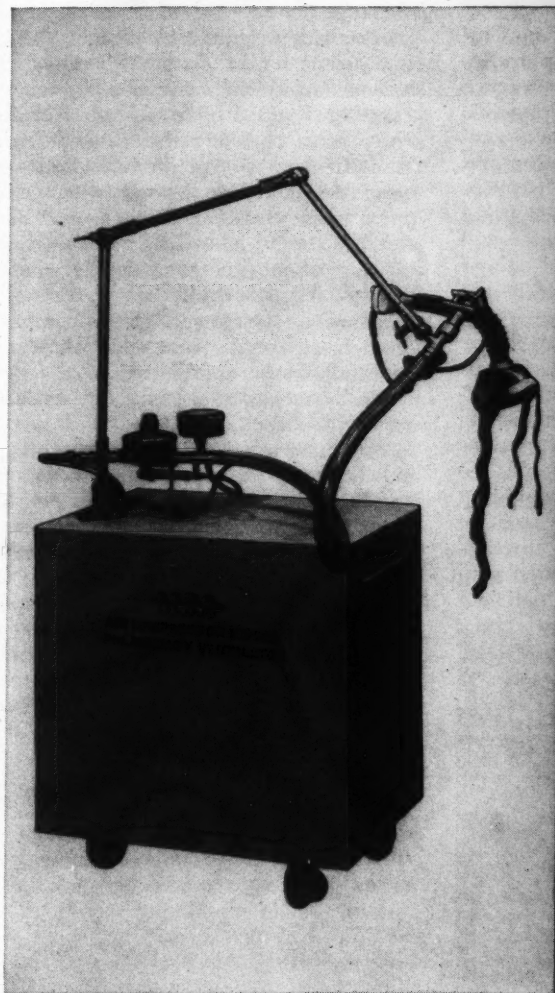
work of Comroe in which the symptoms of oxygen toxicity—substernal distress, cough, sore throat, nasal congestion—were outlined. Oxygen is dangerous, he said, when its concentration approaches 100%, or 1 atmosphere of pressure. If a Scuba diver uses oxygen, the increased pressure as he descends under water brings the oxygen pressure to over 1 atmosphere. Even using compressed air, when he gets down to 132 feet (5 atmospheres), the 20% oxygen of air is at a pressure equal to 1 atmosphere of oxygen (same as breathing 100% oxygen at sea level).

In connection with the dangers of oxygen administration to chronic lung disease patients, Dr. Hurst pointed out that raising the oxygen concentration of the inspired air to only 25 to 28% is often enough to get the percent saturation of hemoglobin up to 75%, which is a level at which a patient can manage. He doesn't require 95% saturation, but does need at least 70%, and may have only 60% when breathing air. Dr. Hurst cited some interesting work of Dr. E. J. M. Campbell of England, dealing with low-oxygen therapy methods. Campbell has developed a venturi mask which injects as much as 50 liters of air per minute with an oxygen input of only 2 or 3 liters. This he feels controls the oxygen concentration in a much more positive manner than any present-day American equipment.

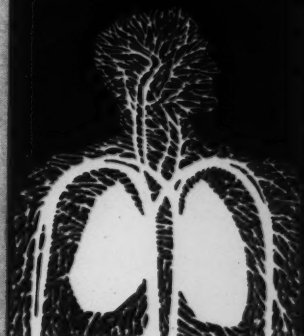
Russell C. Nye, Administrator of Northwestern Hospital, Minneapolis, in discussing the hospital administrator's view of inhalation therapy departments, stated that often administrators are hesitant to set up departments for financial reasons, but that they are more easily convinced if the medical staff demands the facilities. The education problem at hand, then, is two-fold: to prove to the administrators that the department can be an excellent source of income to the hospital, and to convince the medical staff that the department can render more efficient therapy to patients.

"Administration of Oxygen to Tracheotomized and Unconscious Patients," was the topic on which Dr. Albert H. Andrews,

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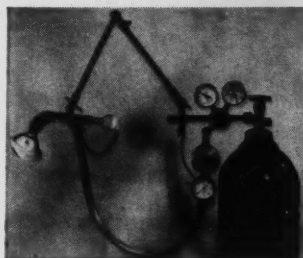
This is the compressor model used for air mixtures.

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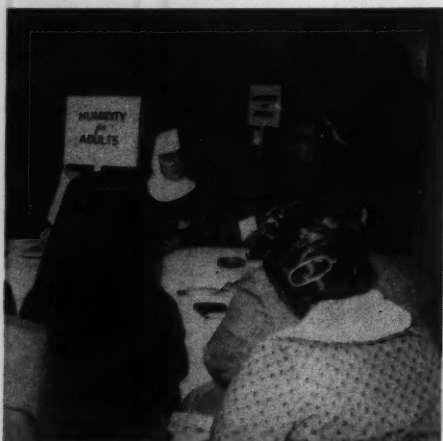


Cylinder Model

continued from page 18

Jr., Attending Broncho-esophagologist at St. Luke's-Presbyterian Hospital in Chicago, spoke. He reviewed the purposes of tracheotomy, with particular reference to tracheo-bronchial toilet, and from this launched into a report of studies on aerosol generators with and without diluters, and with various types of masks. One discovery this research lead to is that when using a diluter on a nebulizer, the diluter will cause it to produce more aerosol *only* if the Relative Humidity of the air in the room is 35% or over.

In discussing inhalation therapy in the recovery room, Dr. Vincent J. Collins named three classes of problems: (1) post-anesthesia cases, which are characterized particularly by airway obstructions and hypoventilation due to drug depression or mechanical restrictions, splinting by pain, shock, etc. (2) Acute or intensive care problems not related to anesthesia—hyperpyrexias and any and all other convulsive disorders; myasthenia, polio or



other paralytic cases, crush injuries of the chest. (3) Comatose patients—cerebrovascular accidents, drug intoxications, CO₂ narcosis, acidosis, trauma. His tips on therapy included the following pointers: to assure good airway, simply tilt head back and bring jaw forward; use vaseline to lubricate catheters instead of water-soluble lubricants that wash off; when possible, choose volume-limited resuscitative apparatus in preference to pressure-

limited apparatus, to assure proper tidal exchange.

In considering the "Selection of Specific Equipment for Inhalation Therapy," Dr. Meyer Saklad, Director, Department of Anesthesiology, Rhode Island Hospital, Providence, classified the indications for such therapy and pointed out that the means employed is dependent upon the particular problem. We should keep clearly in mind what it is we want to do for the patient, and then decide whether the modality selected is doing that.

Regarding treatment of the combined problem of oxygen want and CO₂ excess, he plumped for diminution of the dead space by means of tracheotomy or insertion of an endotracheal tube. With respect to oxygenation of such patients, while he too alluded to Dr. Campbell's diluter mask and to gradual low-concentration methods, it seemed that Dr. Saklad preferred to use higher concentrations with controlled ventilatory assistance in the form of one of the many apparatuses available. He also felt the volume-limited devices superior to the pressure-limited ones, and mentioned that especial care must be taken when using the latter, to keep the airway open in order to insure an adequate tidal volume.

Dr. A. M. Olsen, of the Mayo Clinic, spoke on aerosol therapy in bronchial diseases. He divided the indications for treatment of the principal bronchial disorders into (1) management of bronchospasm, (2) liquefaction of secretions, and (3) the use of aerosol antibiotics to combat infection. He discussed the indications and limitations of techniques and drugs.

"Inhalation Therapy in Chronic Lung Diseases" was treated by R. Drew Miller, M.D., also of Mayo Clinic. His talk was profusely illustrated with slides on various aspects of emphysema, atelectasis and pneumonia, giving a wealth of information about the disease states themselves, and on the relative efficacy of various methods of treating each. He too felt that aerosols of one sort or another probably offered the best results.

Arthur H. Bulbulian, D.D.S., Director of the Mayo Foundation Museum, Rochester, Minnesota, was one of the luncheon

speakers. He presented the development of the famous BLB-Boothby, Lovelace & Bulbulian-mask so prominent in early inhalation therapy. It was an entertaining account of early air travel and the masks which were developed for pilots, and which only later came into clinical use. Dr. Bulbulian was responsible for the design and perfection of this mask.

In the paper, "Oxygen in Incubators," Malcolm A. McCannel, Asst. Clinical Prof. of Ophthalmology, University of Minnesota Hospitals, Minneapolis, asserted that the "use of oxygen, especially in the incubator, is found to be a double-edged sword." He recounted the baffling researches that led to the final establishment of oxygen as the culprit of RLF-Retrolental Fibroplasia, the cause of blindness developing several months after the birth of premature infants. In summary, he stated that at the present time, we use oxygen because of its value in hypoxia, but it is used sparingly because of the dangers involved.

Dr. Richard B. Tudor, Pediatrician, Minneapolis, described "Inhalation Therapy for the Child." One of the points he stressed, in connection with aerosol therapy, is that we should not use bronchodilator drugs for more than 20 minutes at a time, because of undesirable side effects. He recommends the use of aerosol solutions containing both glycerine and propylene glycol, and suggested that *pseudomonas* organisms so common in respiratory

infections are effectively combatted by adding two teaspoons of white vinegar to each quart of aerosol solution to make pH about 4.5. Penicillin attacks gram negative organisms, and streptomycin attacks gram positive ones, he said. Neomycin is his antibiotic of choice for staphylococcus infections.

One of the sessions was devoted to papers by therapists, and much practical information emerged from these as always. Richard T. Danks, Supervising Engineer, the Motherhouse, St. Francis Convent, Springfield, Illinois, spoke on operation, care and maintenance of regulators and flowmeters. Using large models with moving parts to illustrate his points, he described the internal workings of these devices and explained many things about their operation.

Agnes Forrest, Chicago, made a plea for a more sincere interest in the patient, in her "Preparing the Patient for Inhalation Therapy," and reminded the group that in any hospital where there is an inhalation therapy department, the responsibility for this task is definitely on the therapist, and not the nursing staff. Too many therapists, she deplored, are simply going into a patient's room, starting therapy without saying anything, and going out again, leaving the patient wondering what is going on and why.

Melvin H. Hall, Variety Children's Hospital, Miami, gave a scholarly paper

continued on page 22



Presented awards for their "unselfish devotion to the field of Inhalation Therapy" were (from left to right), Arthur H. Bulbulian, D.D.S., Sister M. Borromea, Alvan L. Barach, M.D., Sister M. Rudolph and Edwin Emma, M.D. (accepted by Vincent J. Collins, M.D.)

continued from page 21

on "Pharmacology and Inhalation Therapy," which contains too much of importance to abstract here; the paper will appear in an early issue of the journal.

"The Care and Feeding of Chapters," presented by Don E. Gilbert was a very common-sense approach to the problem of how to make a successful go of a chapter. Examples of the sage advice: "Keep the organizational part of the chapter simple and easy to maintain." "Have some real 'meat-and-potatoes' type of programs for those advanced enough to digest them, but don't forget to have a little elementary part also for those still on a pabulum diet."

President Noble Price gave a dissertation on "Getting Along with Other Services," which dealt with bringing about mutual cooperation among the various hospital departments without overriding authority. It was essentially the art of getting along with people, and a better authority on the subject could hardly be found. It is certainly a pity, this reviewer feels, that all our readers could not hear

Mr. Price's inimitable delivery, which makes all his talks spellbinders.

The closing luncheon session was addressed by one of our award winners, the father of inhalation therapy, Dr. Alvan L. Barach. "Inhalational Therapy: Advances and Retreats" was the provocative title, and it detailed some of each. The most glaring retreat, he feels, is the introduction recently of low-pressure cylinders for use with costly disposable devices, when it has been clearly demonstrated as far back as 1920 that unless high-pressure sources are used, the drop-off of oxygen flow is prompt and sharp, making them quite ineffective.

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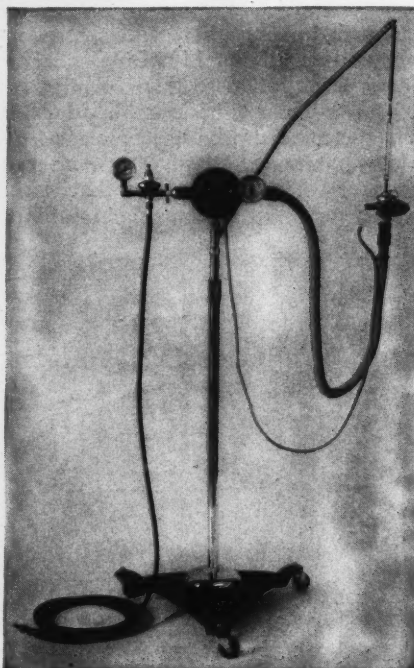
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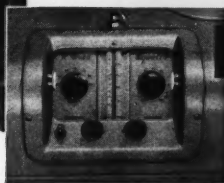
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continued from page 13

amount of immunity can be overwhelmed by large enough doses; whereas if the dose is small the likelihood of infection is correspondingly less.

Suppose, though, that there is a successful invasion: what will be the course of events? When bacteria gain entrance to the body, they promptly begin to multiply and produce *toxins*, which are among the most powerful poisons known. For instance, a very small amount of the toxins of diphtheria or tetanus, even after dilution with many gallons of water, would still be such a strong poison that only a few drops would suffice to kill a person.

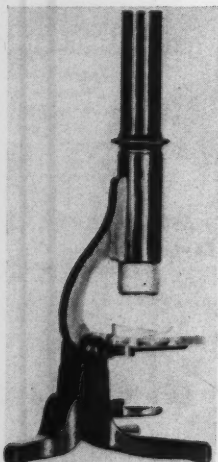
They are classified as endo- and exotoxins. Endotoxins are released only upon death and disintegration of the bacterium, but the exotoxin is secreted by the active organism, is taken up by the bloodstream of the host and circulated throughout his system. The general effects are fever, a feeling of malaise and prostration. Locally, they cause inflammation by dilating the blood vessels, so that more blood comes to that area (redness, swelling). The white blood cells then migrate through the vessel walls into the tissues, where the battle begins between the invaders and the

body's defense mechanisms. The pus subsequently found at this site is composed of the dead bodies of bacteria and white cells. This is a simplified explanation of inflammation and infection, but these things are among the major events taking place.

How are infections controlled? Originally, this was attempted by *anti-septic* means—i.e., by putting something on after the infection was already there. But the use of antiseptics has the obvious disadvantage that most of them which are strong enough to destroy bacteria are also strong enough to do considerable damage to the tissues of the person as well.

Hence there arose the idea of *a-sepsis*, i.e., absence of infection by preventing its occurrence in the first place. In other words, instead of using something *against* sepsis, the totally new concept was developed of not having any organisms around to get into the body. Asepsis has been achieved largely via chemical and heat sterilization of instruments and of everything that surrounds the patient during an operation. So we find that the aseptic approach is in common use today in surgery, while antiseptics continue to be

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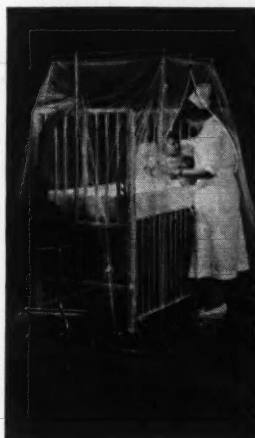
The first microscope made by B&L 1875



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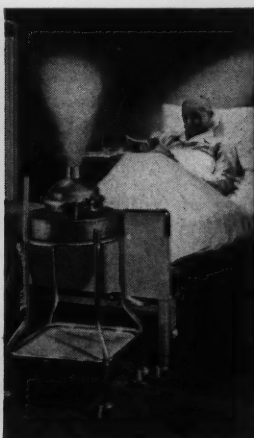
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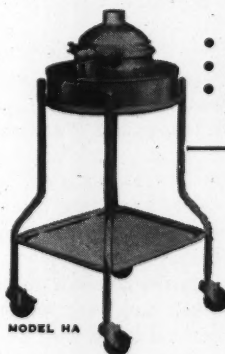
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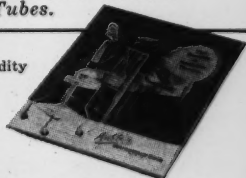
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used as important additional aids.

In addition to these means, we have several others: general cleansing, isolation, and antibiotics. If we have a perfectly smooth surface with no indentations or crannies on it, and we wash that surface with any good washing agent, the majority of bacteria will be removed. Such mechanical cleansing should be considered an indispensable prelude to asperis and antisepsis.

The value of isolation

Isolation was used long ago in attempting to control contagious disease. When it became known that diphtheria, smallpox and other diseases of that nature were spread by being transmitted from one person to another, the patient with the disease was isolated from his fellows until he had recovered. The isolation prevented disease organisms the patient had from coming in contact with people who were well. This principle is being applied more and more commonly to the patient with staphylococcal or other surgical or medical infections in the hospital.

The value of antibiotic drugs in treating infections is unquestioned; but in considering the *prevention* of infection, it is a moot point whether or not they have increased the resistance of organisms so that now we are experiencing an increase in the number of infections. We do know, though, that bacterial infections of all kinds tend to be cyclic. There are great epidemics of one kind or another, which reach a very virulent height for a year or two and then subside. They go away for any of several reasons: (1) a lot of people who survived the illness then have immunity to re-infection, (2) the life cycle of the infecting organism is broken somewhere — as in the great plague of London, where finally the city burned down, and the rats with their lice burned with it. Hence, no more lice to bite the people and transmit the plague organism.

But to get back to antibiotics, in the middle forties when penicillin became available, we finally had an agent that was effective against staphylococci. Many

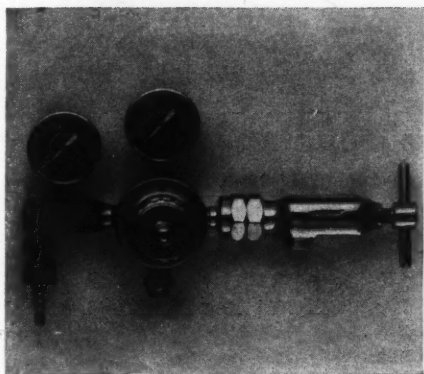
infections that previous to then would have had to be treated surgically were cleared up with penicillin. In the early fifties, however, reports began to appear here and there of infections that were resistant to penicillin. About that time a whole host of new antibiotic drugs came along, and each new one seemed effective in the treatment of those infections resistant to the older antibiotics. But gradually more and more strains of organisms grew up that had developed their own immunity to the drugs we were using. Whether this was because we used the drugs indiscriminately (too many and too extensively when they didn't have to be used), or whether it was simply another manifestation of the cycle of virulence through which organisms pass, is certainly a very provocative problem.

At the present time, surgical procedures have reached a complexity and extent virtually unknown only 10 or 15 years ago. The success of these operations and the safety with which they can be done are seriously jeopardized by sepsis; so with the resurgence of infection present at this time, it is up to us to see that everything possible is done to keep the situation under control.

Set a good example

We are daily going from one patient to another, with various equipment. We should make an effort to see that the instruments and appliances we take to the patients are just as clean and fresh and as nearly sterile as we can get them. There are some limitations because of the nature of the equipment we use, but gradually methods of cleaning and sterilizing this equipment are being developed, which enable us to get closer to this goal.

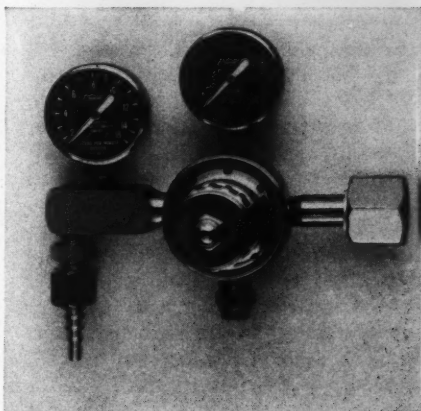
This fight is only as strong as the individuals that carry it out, and the author feels that it behooves people who are in a position of authority to set a good example, and by their teaching methods to instill the proper habits in new personnel as they come along. This is much easier to do than trying to change wrong habits deeply ingrained in experienced personnel who are set in their ways.



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What Is Accomplished by Developing A Separate Department of I. T.?

by Vernon D. Seifert, F.A.C.H.A.

IF we accept the premise that the role of the hospital is to create and maintain facilities and services designed to meet the needs of our patients, then we must conclude that the hospital, being patient-centered, becomes most involved with patients where human effort contributes directly to patient care. The hospital administrator has a responsibility to see that effort in the hospital is properly directed. As an example, that the corridor floor is properly and effectively maintained in a clean and safe condition, as economically as possible.

However, doing a poor job in this area may not necessarily endanger the welfare of the patient as immediately and as critically as doing a poor job in, let's say—nursing service, the laboratory, physical therapy—in short, all of the patient contact, professional or semi-professional services. I would most certainly include Inhalation Therapy in this latter group. The more direct and the more inter-

related this patient contact service becomes, the more concerned we must be with our ability to do this job well, to do it effectively, certainly to do it economically; but most important, that it be done in such a way that the critical needs of the patient are met.

There is an old saying that, "What is everybody's business is nobody's business." In other words, a job left for everyone to do seldom gets done. We are accustomed, in our society, to the "appointing" of certain people to certain jobs. As the technical demands of the job increase, we become more insistent upon the proper training, and on clearly defining and assigning the responsibility for the action. This has been the underlying impetus for the development of the many in-hospital specialties with which we deal today. At times we fear this fractionalization of care, and yet we must conclude that this is the now well-established pattern and the essential one, if we are to do the job well.

Although trained, well-qualified inhalation therapists are becoming more common, still the majority of hospitals assign this task to the nursing service, resulting in a wide variance in the degree of competence of the people to whom this task is assigned.

If we conclude this is a technical task, using certainly technical equipment—if we conclude that there exists a wide variance



Vernon D. Seifert is a graduate of Northwestern University, Chicago, Illinois. He is administrator of Fairview Park Hospital, Cleveland, Ohio and a Fellow of the American College of Hospital Administrators.

in the degree of effectiveness in which the equipment is used — then it would seem to me that we should also conclude that this service requires people who have special training and special experience commensurate with the needs of the technical task to be accomplished. If we limit the scope of responsibility of an individual, if we require him to delineate and restrict his field of interest to a limited task, we then have every right to expect that he or she will become more proficient in the specific task assigned, and can conclude that this individual will use all the means at his disposal to prepare himself — with help as necessary — in a manner sufficient to meet the need of the task assigned. After all, this is what we do in each case in which we specialize. To me, *this is the justification for the field of inhalation therapy*, and incidentally, it is the same justification for any other specialty field.

Advantages listed

What do we hope to accomplish by the development of a special department of inhalation therapy in the acute general hospital? What are the advantages of developing trained and qualified inhalation therapists? First of all, we will expect that oxygen, when ordered for the patient, will actually be administered to the patient in the specific way in which it is ordered, that the patient will receive this in the form and in the quantity ordered by the physician.

Second, we can expect that the equipment required to administer the oxygen will be in proper working order, will be properly maintained, and will be constantly available as needed.

Third, we can expect that appropriate record keeping will be a continuous part of the operation, that the required information will be added to the patient's clinical chart, indicating clearly and accurately the quantity of oxygen administered and the modality by which this was done. Also, that an accurate record of oxygen purchased, consumed and charged to the patient's account will be maintained. This is very important for cost determination.

Fourth, that the entire known field of oxygen therapy and its related techniques will be available to our patients.

Fifth, that an on-going in-service educational process will be in evidence. This means graduate staff and student nurses will be properly trained in oxygen therapy in an effective, uniform manner; in its use, as well as the equipment essential for its use.

Sixth, the hospital administrator has a right to expect that his inhalation therapists will not only satisfactorily accomplish all the foregoing things, but that they will keep abreast of current developments in their field, that they will intelligently and continually develop their own skills, and finally, that they will make what contribution is within their power towards the research, study and the literature as it is related to their field of endeavor.

All of this means that the patient will enjoy the most effective inhalation therapy obtainable.

Experience would indicate that when inhalation therapy is assigned to the nursing service, it does not operate as effectively as when placed under the supervision of the Department of Anesthesia. Association of these departments appears to be natural, in that they both deal in different ways with the respiratory system. Also, relieving our nursing personnel of this one duty, although not demonstrable in actual dollar savings, most certainly serves to transfer some of the work away from this already heavily-loaded specialty.

The inhalation therapist should be qualified to maintain and repair all technical inhalation therapy equipment. With the exception of major procedures, preventive maintenance and repairs should be done within the hospital.

Benefits to be derived

It would be foolhardy to say that a department of inhalation therapy will save money. The proper organization, manned by the proper people will most certainly enhance the quality of the inhalation therapy provided for the patient. An effective department will result in the use of

greater volumes of oxygen, for the simple reason that the medical staff will become increasingly cognizant of the department's excellence. They will tend to order inhalation therapy more frequently; they will rely on its use to an increasing extent; and, admittedly, on occasion may even over-use this service—a development that should be watched for. However, I have never felt that this type of abuse is one which should discourage us from taking advantage of the benefits to be derived from the well-planned inhalation therapy department.

Adequate statistics important

Another advantage that the administrator obtains through such organization is that of having routinely at his disposal a completely adequate statistical and financial analysis of this operation. Examples of statistics that we have immediately available at Fairview Park are: oxygen tents are in use an average of 53% of the time; the department gives an average of 11 IPPB treatments daily; we use an average of 132,000 cubic feet of gas monthly; about 17.5% of our admissions will have oxygen ordered for them, and they will use an average of 12.8 cubic feet of gas per patient per day.

We know the total charges made to patient accounts each day, and exactly how much gas we have bought and what it cost, which gives us a constant check on what portion of this cost has been charged to patient accounts. In short, we know if we are making or losing money on the service, and hence whether our charges are adequate or excessive. Thus we have the information we need to administer this service effectively.

Further, we can be assured that our patients will receive this form of therapy in a manner adequate to their needs, as ordered by their physicians. I wonder if such figures are as easily obtainable in hospitals without inhalation therapy departments?

I believe that inhalation therapy is here to stay. This is a new skill now available to us, one which we should be aware of and one which we should use intelligently.

AAIT CHAPTERS

Below is the up-to-date list of Chapters. We are sorry that inadvertently an old list was published in the October issue.

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Boston 14, Mass.

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Mr. Allen Claghorn
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Darien, Connecticut

DELAWARE VALLEY
Mr. Walter Palmer
3731 Hamilton St.
Philadelphia, Pa.

FLORIDA
Mr. Idilio J. Borges
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ILLINOIS CHAPTER
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St. Luke's-Presbyterian Hospital
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Chicago, Illinois

MICHIGAN
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SOUTHERN ILLINOIS
Carl Staellis
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Presently, five other chapters are being organized, and we shall list them at a later date.

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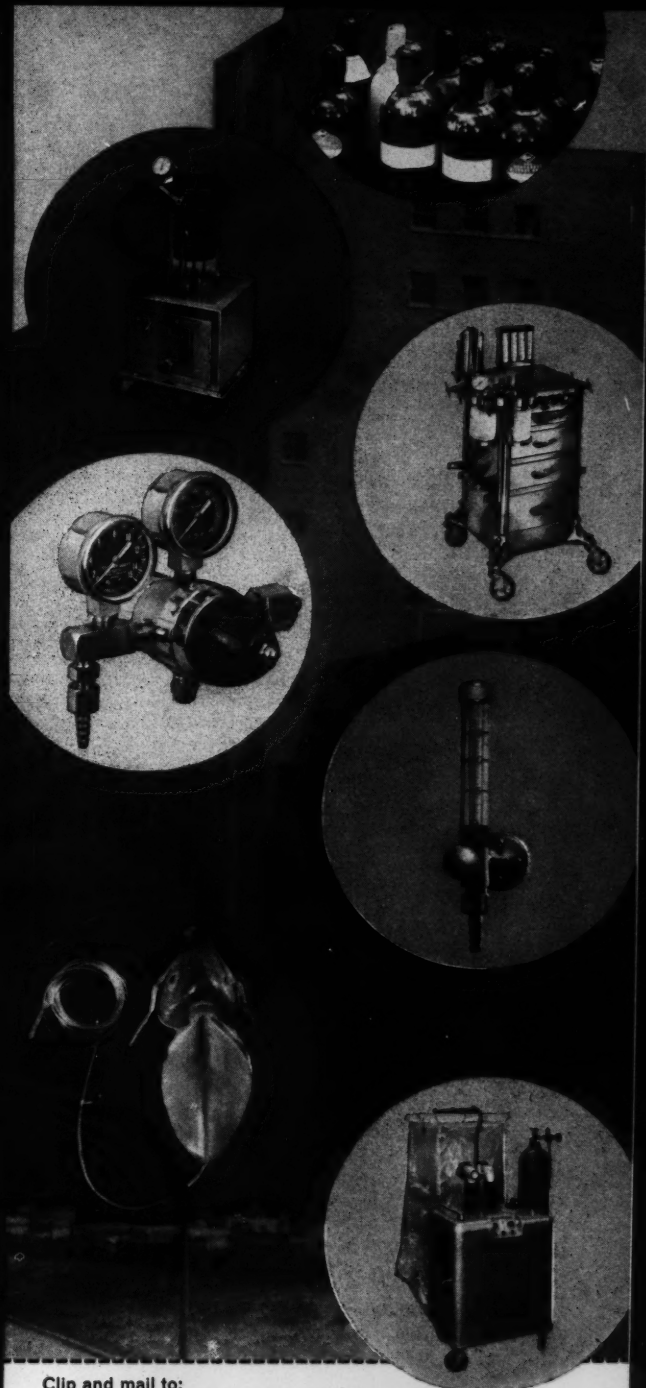
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FILM REVIEW

"IPPB/I — ITS CLINICAL APPLICATIONS AND ADMINISTRATION," by Theodore H. Noehren, M.D., F.A.C.C.P. This is a 35 mm color-sound film, 32 min. running time. Available on loan from the American Medical Association, 535 North Dearborn St., Chicago 10, Ill., or for rent or sale by the American Film Producers, 1600 Broadway, New York, N.Y.

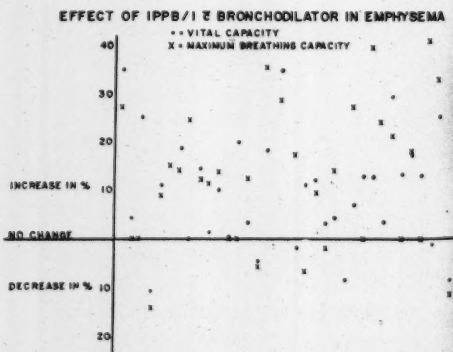
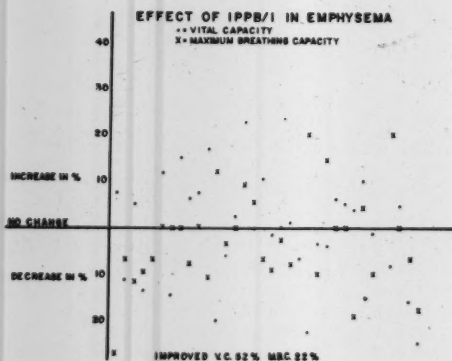
Prepared in the Inhalation Therapy and Medical Photography departments of the Buffalo General Hospital, with the technical assistance of Dr. Donald Summerville, this film demonstrates details of proper administration of intermittent positive pressure breathing therapy in a straightforward, convincing manner which will be of great use in education programs for doctors, internes, nurses, therapists or interested lay people.

It shows the steps in giving such therapy, including the preparation of the patient for treatment, coaching him so that he will get the most out of it, and technical pointers on care and sanitation of the equipment.

There is an interesting discussion of Atelectasis, featuring some X-Rays of the chest which very dramatically—even for the unskilled X-Ray reader—depict the difference between the atelectatic lung and the clear, open one. In this connection, it is made clear how easily atelectasis is fostered by high concentrations of oxygen getting behind obstructions in the smaller airways; and emphasis is placed on using compressed air or the lowest concentration of oxygen available for IPPB treatments.

There is also a section on the effects IPPB/I on the results of such pulmonary function tests as the Vital Capacity and the Maximum Breathing Capacity. Reproduced here are two graphs from the film, which show at a glance the difference in effect of IPPB/I with and without the use of bronchodilator drugs. The section also includes some typical test records which are so clear there is no need for elaborate interpretation.

The film is clear, concise, and technically excellent; it is a valuable addition to the educational materials available in this field, and as far as we know, the only film on this particular subject.—J. F. W.





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accurately administer
prescribed inhalation
therapy regardless
of patient's breathing
characteristics

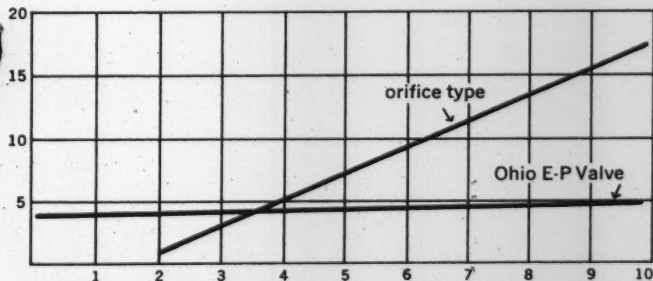
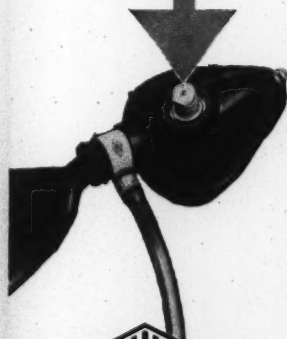
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**EXHALATION-
PRESSURE VALVE**



The new E-P Valve may be purchased separately for attachment to any Ohio No. 100 Mask. It is also available in combination with the No. 100 Mask and Oxygen Diluter — or with the No. 100 Mask without diluter.

Ohio Chemical's unique E-P Valve employs the principle of a spring-loaded relief valve rather than the variable orifice type. Therefore, exhalation pressure may be *precisely controlled* from 0 to 6 centimeters of water. Each setting (from 0 to 6) is clearly marked on the knurled knob of the molded Nylon body of the valve. An attached metal pointer assures a fixed setting. The E-P Valve weighs only one-third of an ounce. It may be easily removed from the mask for cleaning and sterilizing.

For complete information, write Dept. IT-12, Ohio Chemical & Surgical Equipment Co., Madison 10, Wisconsin; on the West Coast, Ohio Chemical Pacific Company, Berkeley 10, Calif.; in Canada, Ohio Chemical Canada Limited, Toronto 2, Ont.; overseas, Airco Company International, New York City 17 (all divisions or subsidiaries of Air Reduction Company, Inc.)



THIS CHART COMPARES ACCURACY OF OHIO'S NEW E-P VALVE WITH THAT OF CONVENTIONAL ORIFICE TYPE WITH 4 CM. OF H₂O SETTING.



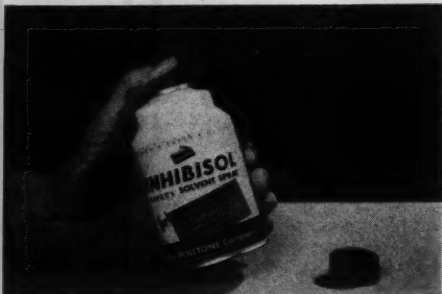
Ohio Chemical / Serving the Medical Profession
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EQUIPMENT NEWS

(Information and photographs are supplied by the manufacturers or distributors.)

Inhibisol Solvent

The Penatone Company, Tenaft, New Jersey, manufactures a new safety solvent, Inhibisol, which is safe for the user as well as for the equipment being cleaned. Being nonflammable and unaffected by oxygen, it may be used for cleaning in and around oxygen equipment, such as coils and condensers of oxygen tents. It has no corrosive action on any metals or electrical insulation, and dries quickly, leaving no residue. In aerosol form, it is simply sprayed on and loosens the soil, which can then be wiped off. The vapor contains no chlorinated compounds like carbon tetrachloride, and is not damaging to liver, kidneys or other vital organs. **No. 527**



Kardex Maintenance System

Remington Rand, a division of Sperry Rand Corporation, New York, produces a Kardex Visible Preventive Maintenance System. Mechanical and electrical equipment is catalogued on these forms, which schedule periodic review and provide details of the inspections and/or maintenance work to be done. There is also space for a cumulative record of the work done on equipment and the cost.

Over the scale of weeks at the bottom of the form, Kardlok signals are set to indicate, by their position, the period for the next scheduled inspection.

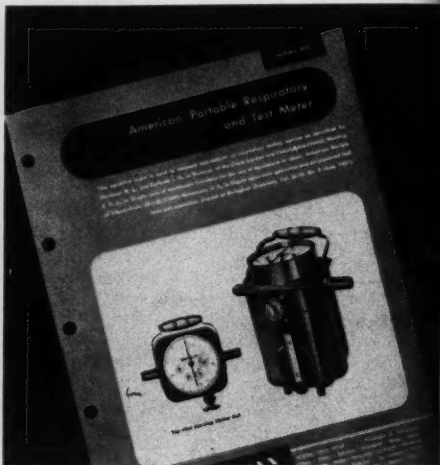
The manufacturer claims the system organizes preventive maintenance program for equipment in a way that insures no tasks are overlooked. This lengthens equipment life and minimizes disruptions to patient care due to mechanical breakdowns. **No. 528**

Respiratory and Test Meter

Bulletin 502, just published by American Meter Company, Erie, Penna., provides full details on the American Portable Respiratory and Test Meter, a compact instrument used to measure exhalations in respiratory testing service.

Because of its sensitivity and accuracy, this meter is also useful for a variety of sensitive test measurements on air and inert gases. It will operate with a pressure differential of only a few tenths of an inch of water. Its rated capacity is 45 liters per minute of air at $\frac{1}{2}$ inch w.c. differential.

Included in the bulletin are additional data on design and application. **No. 529**



MORE DATA . . .

. . . can be obtained by mailing this coupon to "Inhalation Therapy," Room 904, 332 South Michigan Avenue, Chicago 4, Illinois.

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